[0177] The computer then receives the data from the one or more sensors/detectors included within the system, and interprets the data, either provides it in a user understood format, or uses that data to initiate further controller instructions, in accordance with the programming, e.g., such as in monitoring and control of flow rates, temperatures, applied voltages, and the like.

[0178] In the present invention, the computer typically includes software for the monitoring and control of materials in the channels. For example, the software directs channel switching to control and direct flow as described above. Additionally the software is optionally used to control electrokinetic or pressure-modulated injection or withdrawal of material. The injection or withdrawal is used to modulate the flow rate as described above. The computer also typically provides instructions, e.g., to the controller or fluid direction system for switching flow between channels to achieve a high throughput format.

[0179] In addition, the computer optionally includes software for deconvolution of the signal or signals from the detection system. For example, the deconvolution distinguishes between two detectably different spectral characteristics that were both detected, e.g., when a substrate and product comprise detectably different labels.

[0180] Any controller or computer optionally includes a monitor which is often a cathode ray tube ("CRT") display, a flat panel display (e.g., active matrix liquid crystal display, liquid crystal display), or the like. Data produced from the microfluidic device, e.g., thermal property curves from binding assays, is optionally displayed in electronic form on the monitor. Additionally, the data, e.g., thermal property curves, or other data, gathered from the microfluidic device can be outputted in printed form. The data, whether in printed form or electronic form (e.g., as displayed on a monitor), can be in various or multiple formats, e.g., curves, histograms, numeric series, tables, graphs and the like.

[0181] Computer circuitry is often placed in a box which includes, e.g., numerous integrated circuit chips, such as a microprocessor, memory, interface circuits. The box also optionally includes a hard disk drive, a floppy disk drive, a high capacity removable drive such as a writeable CD-ROM, and other common peripheral elements. Inputting devices such as a keyboard or mouse optionally provide for input from a user and for user selection of sequences to be compared or otherwise manipulated in the relevant computer system.

[0182] Example Integrated Systems

[0183] FIG. **1**, Panels A, B, and C and FIG. **2** provide additional details regarding example integrated systems that are optionally used to practice the methods herein. An integrated system in accordance with the invention comprises a microfluidic device **100** that is a replaceable component, like a cartridge or cassette, that is interfaced with an instrument **200**. The microfluidic device shown in FIGS. **1** and **2** comprises a body structure **102** that has a main channel **104** disposed therein. A sample or mixture of components is optionally flowed from pipettor **120** towards reservoir **114**, e.g., by applying a vacuum at reservoir **114** (or another point in the system) or by applying appropriate voltage gradients. Accordingly, the pipettor represents the farthest upstream point in the fluid flow path, while reservoir **114** represent the farthest downstream point in the fluid flow path. Alternatively, a vacuum is applied at, e.g., reservoirs **108**, **112** or through pipettor channel **120**. Additional materials, such as buffer solutions, substrate solutions, enzyme solutions, test molecules, fluorescence indicator dyes or molecules, and the like as described herein are optionally flowed from wells, e.g., **108** or **112** and into main channel **104**. Flow from these wells is optionally performed by modulating fluid pressure, or by electrokinetic approaches as described (or both). As fluid is added to main channel **104**, e.g., from reservoir **108**, the flow rate increases. The flow rate is optionally reduced by flowing a portion of the fluid from main channel **104** into flow reduction channel **106** or **110**. The arrangement of channels depicted in FIG. **1** is only one possible arrangement out of many which are appropriate and available for use in the present invention. Additional alternatives can be devised, e.g., by combining the microfluidic elements described herein, e.g., flow reduction channels, with other microfluidic devices described in the patents and applications referenced herein.

[0184] Samples and materials are optionally flowed from the enumerated wells or from a source external to the body structure. As depicted, the integrated system optionally includes pipettor channel **120**, e.g., protruding from body **102**, for accessing a source of materials external to the microfluidic system. Typically, the external source is a microtiter dish or other convenient storage medium. For example, as depicted in FIG. **2**, pipettor channel **120** can access microwell plate **208**, which includes sample materials (e.g., test molecules and/or target molecules), buffers, substrate solutions, fluorescence indicator dyes or molecules, enzyme solutions, and the like, in the wells of the plate.

[0185] The instrument **200** that interfaces with the microfluidic device **100** can perform a variety of different functions: supplying the driving forces that propel fluid through the channels in the chip, monitoring and controlling conditions (e.g., temperature) within the channels of the microfluidic device, detecting signals emanating from the chip, introducing fluids into and extracting fluids out of the chip, and possibly many others. Instruments **200** in accordance with the invention are typically computer controlled so that they can be programmed to interface with different types of microfluidic devices, and/or to carry out desired processes within a particular microfluidic device. The microfluidic device typically interfaces with an instrument in the manner described in U.S. Pat. Nos. 5,955,028; 6,071,478; 6,399,023; and 6,399,025.

[0186] Detector **206** is in sensory communication with channel **104**, detecting signals resulting, e.g., from labeled materials flowing through the detection region, changes in heat capacity or other thermal parameters, etc. Detector **206** is optionally coupled to any of the channels or regions of the device where detection is desired. Detector **206** is operably linked to computer **204**, which digitizes, stores, and manipulates signal information detected by detector **206**, e.g., using